High Temporal Resolution GPS Measurements of Far-Field Crusts] Deformation During the June 28, 1992, Landers and Big Mar, CA, Earthquake Sequence

S. Astle (Department of Geology, Utah State University, Logan, UT)
D. M. Tralli (Earth and Space Sciences Division, Jet Propulsion Laboratory, California institute of Technology, Pasadena, CA)

Global Positioning System (GPS) data collected during the June 28, 1992, Landers and Big Bear, CA, earthquake sequence were analyzed to detect preseismic and postseismic far-field deformation, if present. nigh temporal resolution GPS measurements have the capability of detecting deformation of a few millimeters over a span of several minutcs to hours. Results yield relative errors of about 3 millimeters with 2 min estimate intervals in a time series spanning 5 days.

A dominant period of 24 hrs is evident which we attribute to the daily evolution of satellite geometry. As satellites go in and out of view, position estimates at a given receiver change while errors decrease and increase accordingly. High sample rate GPS estimates are subject to a periodicity that otherwise is averaged out by daily estimates. In applications which consistently demand high precision and temporal resolution, this must be filtered. Fault monitoring is one such application.

Amplitude spectra of the relative positioning time series estimates between sites at Pinyon Flat, JPL, and Goldstone were obtained and notch filtered at 1 and 2 cycles/day (one overtone). Peak-to-peak scatter was reduced to less than 4 mm from what previously included 1 cm fluctuations.

Preliminary results do not indicate evidence of preseismic deformation, or postseismic relaxation immediately following the earthquake sequence. Available data are relevant only to the far-field. However, we were able to differentiate the contribution of the Big Bear earthquake. to the published over-all coseismic displacement.

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2..001405498 (D. M. Tralli)

3. (a) David M. Tralli
M S 1 8 3 - 5 0 1
Jet Propulsion Laboratory
4800 Oak Grow Drive
Pasadena CA 91109

(b) 818-354-1835

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5. (a) G05 Earthquake Geodesy
(b) 7215 Earthquake parameters
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Charge to acct. #
325-27002 -0-326-0
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109

9. C (Contributed)